

STORMS AND WEATHER WARNINGS

WASHINGTON FORECAST DISTRICT

The month was characterized by considerable activity in the Tropics, in that three disturbances occurred. The first, which appeared on August 28 in the vicinity of Dominica and continued into September, was of major importance. The other two, which developed over the southeastern Gulf of Mexico on the 13th and 28th, were of lesser intensity.

A tropical disturbance at the beginning of the month was central about latitude 25° N. and longitude 70° W. The history and subsequent movement of this disturbance is discussed in the MONTHLY WEATHER REVIEW for August.

Later information which has just come to hand indicates that the center of this storm passed between Antigua and Montserrat (Lesser Antilles) at 3:30 a. m. of the 28th. At 2 a. m. of the 29th the center with a reading of 28.56 inches passed over the eastern end of the island of St. John. The western end of the island of Tortola experienced hurricane winds from 6 p. m. of the 28th to 6 a. m. of the 29th. The storm was accompanied by torrential rains and by winds estimated about 100 to 110 miles an hour. The rains of the 28th and 29th at St. Kitts, 17 inches, and Nevis, 20 inches, are reported to be the heaviest recorded in 40 years. More than 100 lives were reported lost and more than 1,000 houses destroyed, while serious damage resulted to crops along the path of the storm from Montserrat to St. Thomas. The observer at St. Thomas estimated the wind at 110 miles per hour from the north-northeast between midnight and 2 a. m. of the 29th. Estimates of 100 to 110 miles per hour were also made at Montserrat and Antigua between 3 a. m. and 4 a. m. of the 28th.

In connection with a disturbance over eastern Quebec on the 5th, northwest storm warnings were ordered for the Atlantic coast from Sandy Hook to Eastport. Winds of moderate gale force occurred south of Nantucket, but to the northward winds were only fresh to strong.

On the 9th a disturbance of moderate intensity was central over the upper St. Lawrence Valley, and southwest storm warnings were displayed on the Atlantic coast from Delaware Breakwater to Eastport. A secondary storm developed off the southern Massachusetts coast on the morning of the 10th and warnings were changed to southeast from Nantucket to Eastport. Strong winds and gales occurred generally over the region indicated.

On the morning of the 13th there were indications of the development of a tropical disturbance over the southeastern Gulf of Mexico. This disturbance moved northwestward during the following 12 hours. It thence recurved rather sharply and moved slowly east-northeastward during the next two days, striking the north-west Florida coast near and east of Port St. Joe about 11 a. m. of the 15th. The highest winds at Port St. Joe have been estimated at 75 to 80 miles per hour from the northwest. At St. Andrews the winds at their highest were estimated at from 60 to 75 miles per hour and at Carrabelle from 40 to 50 miles with lowest barometer reading at the latter 29.10 inches at about 2:30 p. m. of the 15th. The lowest pressure reading at Apalachicola was 29.12 inches at 12:40 p. m. of the 15th, and the highest wind velocity was 68 miles per hour from the southeast.

In commenting on this disturbance the official in charge at Pensacola, Fla., writes as follows:

No report of damage at sea has been received with the exception of the three-masted schooner which was blown ashore near Carra-

belle, and the blowing ashore of two fishing boats near Port St. Joe. The harbor damages were relatively small considering the force and duration of the storm, which is probably explained by the timely warnings which were evidently heeded, as is indicated by the St. Andrews storm warning display man, who states that all boats in the bay were placed in safe harbors upon receipt of the warnings.

From the time of the inception of this storm full information was disseminated by every available means to coast interests and to vessels at sea. While the storm did not attain hurricane intensity, winds of gale force occurred along its immediate path, and some damage to property between Carrabelle and St. Andrews is reported. The disturbance passed east-northeast across northern Florida and was central on the evening of the 16th on the South Carolina coast. It then continued its north-eastward course and by the evening of the 18th was over the steamship routes south of Newfoundland. Strong winds and gales were general along the Atlantic seaboard, warnings of which were issued well in advance.

Pressure was low over the northwestern Caribbean from the 23d to the 27th, but vessel reports indicated no cyclonic circulation. On the 28th information was broadcast by radio announcing the presence of an incipient disturbance over the southeastern Gulf. Radio reports on the morning of the 29th showed a disturbance of slight but apparently increasing intensity moving northward, and storm warnings were hoisted on the east Gulf coast. Information was disseminated that the disturbance would move northeastward and cause dangerous gales along its path. The disturbance advanced rapidly north and northeastward and crossed the north-west Florida coast near Cedar Keys during the late afternoon of the 29th. During the afternoon of the 29th storm warnings were ordered for the south Atlantic coast from Jacksonville to Fort Monroe, Va., in anticipation of the northward movement of the tropical disturbance. By the following morning the storm was over the North Carolina coast with increased intensity. Storm warnings, which were displayed on the middle Atlantic coast in connection with a development over Virginia, were continued. Storm warnings were also ordered for the north Atlantic coast. The disturbance moved rapidly northward and easterly gales were experienced along the entire Atlantic seaboard.

Frost warnings were issued on the 10th for New York, Pennsylvania, New Jersey, West Virginia, and the eastern portions of Kentucky, Tennessee, and Ohio; and frosts occurred over portions of the States mentioned, but in other portions frost was prevented by cloudiness.

On the 23d, 24th, and 25th frost warnings were disseminated for portions of New England and the northern portion of the Middle Atlantic States, and frosts occurred substantially as indicated in the warnings. On the 30th frost warnings were issued for Tennessee and Kentucky and were verified. In addition, frosts occurred in the extreme north portion of the east Gulf States and in the southern Appalachian region.

During the early days of the month the special advices and bulletins furnished to the world fliers twice daily and at other times when required, materially assisted in the successful carrying out of their flying program.—*R. H. Weightman.*

CHICAGO FORECAST DISTRICT

Frost warnings.—September was cool over virtually the entire forecast district—decidedly so in the eastern portion, and frost warnings were required with greater frequency than usual. In fact, warnings of this character were issued for some part of the district on no fewer than

23 days. The most important frosts were those of the closing 4 days of the month, when the formation was heavy or killing in all except extreme southeastern sections. Special attention was given to the warnings for Nebraska, Iowa, and Illinois, owing to the critical condition of the corn crop in respect to seed; and it is known that because of the warnings much seed corn was saved. Then, too, the warnings for the cranberry interests in Wisconsin served a useful purpose, as indicated in several letters that have come to hand. At the close of the month warnings were no longer being issued for most of the Northern Rocky Mountain region, the growing season there having terminated.

Storm warnings.—On the Great Lakes, particularly on the Lower Lakes, the month was more inclement than the average September. Storm warnings were issued on six days, and small-craft warnings on five other days.

No warnings of any character were issued until the 12th, although disturbances on the 2d and 5th caused gales of brief duration over central Lake Erie, and on the 8th–9th over part of the eastern Lake region, including extreme eastern Lake Superior. In some instances the winds referred to occurred in connection with thunderstorms.

On the 12th either southwest or northwest warnings were issued for practically all the Great Lakes, in connection with a disturbance over northern Lake Michigan, but the warnings were lowered in the evening, when the force of the storm appeared to have been spent. Generally speaking, the warnings were well verified.

The remainder of the second decade was mostly quiet, but on the morning of the 21st, with a disturbance of rapidly increasing energy central over southern Minnesota, warnings were issued for the Upper Lakes, and 12 hours later for the Lower Lakes. The center of the storm moved rapidly north-northeastward and later northeastward, and by the evening of the 22d had practically disappeared from the field of observation. The warnings issued in this connection were for the most part verified.

On the morning of the 26th a disturbance in the form of a trough and of some depth covered the Plains States, and at the same time a large high pressure area overlay the northeast, thus creating a marked gradient. Accordingly, warnings were issued for most of the Upper Lakes section. On the following morning, with the storm then decreasing in strength, small-craft warnings were advised for all the Great Lakes, except Lake Ontario.

Small-craft warnings were advised for the Lower Lakes on the 29th, when a disturbance of increasing energy covered the Middle and South Atlantic States, and indicated an almost due northward movement. As a result of afternoon special observations northeast storm warnings were issued for Lake Ontario, and at night these were extended westward on Lake Erie to the Cleveland district. The only verifying winds within the 36-hour period occurred at Cleveland, although 60 miles was reached at Buffalo, N. Y., on October 1.

The fire-weather forecasts for western Montana were discontinued for the season on the 20th, and those for the benefit of fruit interests in Door County, Wis., and southwestern Michigan, on the 30th.—*C. A. Donnel.*

NEW ORLEANS FORECAST DISTRICT

No storm occurred on the west Gulf coast during the month and no storm warnings were issued from New Orleans. Small-craft warnings were displayed on part

of the Texas coast on the 12th, and all the Texas coast on the 28th.

Storm warnings were issued from the Central Office for New Orleans and Burrwood on the 13th and 14th, and for Burrwood on the 29th, but no storm verifying velocities occurred.

Frost warnings were issued on the 27th for the northwestern portion of the district, and on the 28th and 29th for the northern portion, and light frost occurred in scattered localities on the 28th, 29th, and 30th. No frost warnings were issued on the 20th, because at the rate the high-pressure area was traveling it would have been too far east by October 1 to give frost in this district; but it dropped southward with a slower eastward movement and light frost occurred in scattered localities in eastern Arkansas and northern Louisiana.—*I. M. Cline.*

DENVER FORECAST DISTRICT

Areas of low atmospheric pressure, followed by areas of high, crossed the district three times during the month, causing sharp falls in temperature, while at the beginning of the month another temperature and pressure transition was in progress. Warnings of frost were necessary and were issued for various appropriate portions of the district on the 1st, the 11th to 13th, the 18th to 22d, and the 25th to 29th, inclusive. Warnings of freezing or lower temperatures were included on the 20th for southwestern Colorado, northeastern Arizona, southern and extreme northwestern Utah, on the 21st for southwestern and exposed places in northern and eastern Colorado, northwestern New Mexico, northeastern Arizona, and exposed places in Utah; on the 26th for western Colorado, northwestern New Mexico, northeastern Arizona, and Utah; on the 27th for northwestern New Mexico and northeastern Arizona, and for exposed places in Colorado and Utah; on the 28th for southwestern Colorado and northwestern New Mexico, and on the 29th for exposed places in southwestern Colorado. On mornings subsequent to those on which the foregoing warnings were issued, temperatures were experienced far enough below freezing to kill green crops in the colder sections, while much damage was done to crops in the milder sections by temperatures of freezing and below.

As a result of the unusually dry summer a high fire hazard prevailed during a considerable portion of the month, consequently daily advice was published relative to the hazard in the forested districts, particularly for Colorado. The rains from the 9th to the 11th were especially beneficial in reducing the hazard for a time. Special warnings were issued on the 19th and 25th for southern Utah, Arizona, and New Mexico for increasing westerly winds which would add to the danger, due to the influence of low-pressure areas moving over the sections named without causing appreciable precipitation. The increase in the wind subsequent to the warning of the 25th was most pronounced, velocities of 46 miles an hour from a westerly direction being reported from the Weather Bureau stations at Modena, Utah, and Albuquerque, N. Mex.

Owing to the extremely low water in the lower Colorado River and the resultant heavy losses in the adjacent irrigation districts, numerous requests were answered relative to the probable rise that would be caused by the heavy rains which fell in the middle and upper drainage areas from the 9th to the 11th.—*Lawrence C. Fisher.*